

FIG. 1A

POLARIZATION
DIRECTION

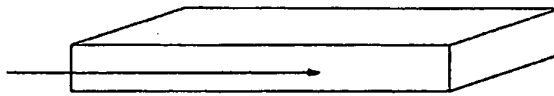


FIG. 1B

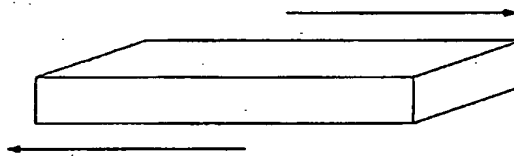


FIG. 2

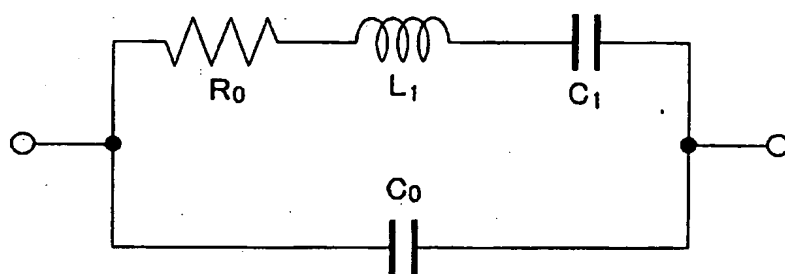


FIG. 3

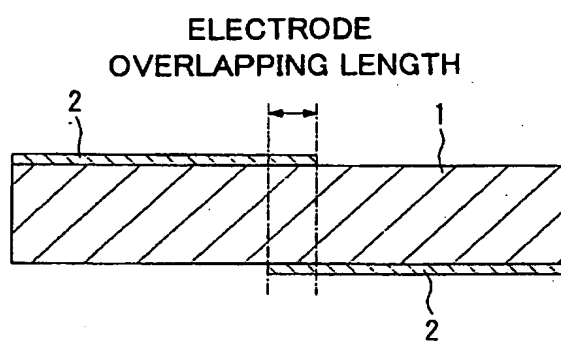
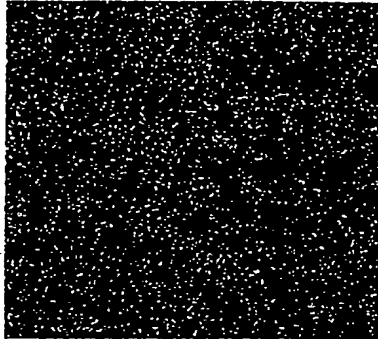


FIG. 4

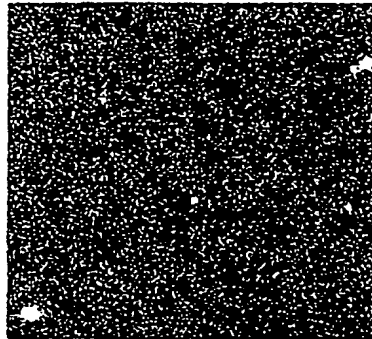
SPECIMEN No.	ADDITIVE		MAIN COMPONENT $Pb_\alpha[(Mn_{1/3}Nb_{2/3})_xTi_yZr_z]O_3$ ($x+y+z=1$)				ELECTRIC PROPERTIES Q_{max}	MECHANICAL STRENGTH σ_{b3} (N/mm ²)	HEAT RESISTING PROPERTIES $ \Delta F_0 $ (%)	AL- CONTAINING PHASE
	Al ₂ O ₃ (wt%)	SiO ₂ (wt%)	α (mol)	x (mol)	y (mol)	z (mol)				
1	0.1						120	155	0.11	x
2	0.3						135	172	0.07	O
3	0.5	0.02	0.99	0.10	0.53	0.37	136	179	0.08	O
4	0.7						130	192	0.07	O
5	1.0						133	192	0.07	O

FIG. 5

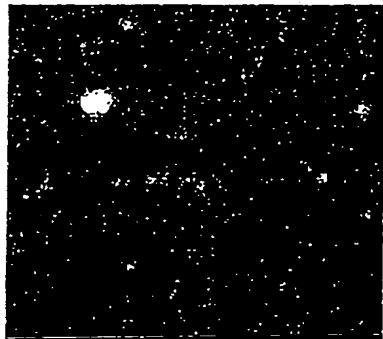
SPECIMEN No. 1



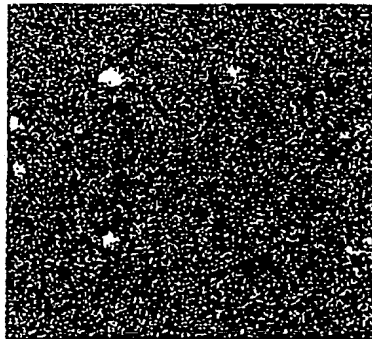
SPECIMEN No. 2



SPECIMEN No. 3



SPECIMEN No. 4



SPECIMEN No. 5

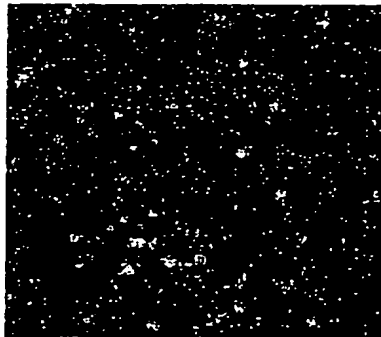


FIG. 6

SPECIMEN No.	ADDITIVE (β)		MAIN COMPONENT Pb _a [(Mn _{1/3} Nb _{2/3}) _x Ti _y Zr ₂]O ₃ (x+y+z=1)					ELECTRIC PROPERTIES Q _{max}	HEAT RESISTING PROPERTIES Δk ₁₅ (%)	TEMPERATURE CHARACTERISTICS	
	Al ₂ O ₃ (wt%)	SiO ₂ (wt%)	α (mol)	x (mol)	y (mol)	z (mol)	ΔF ₀ (-40°C)			ΔF ₀ (85°C)	
6	0.01	0.02	0.998	0.10	0.51	0.39	135	3.9	0.18	0.08	
7	0.02						125	3.0	0.16	0.05	
8	0.10						128	2.9	0.21	0.10	
9	0.50						145	1.9	0.27	0.14	
10	1.00						110	3.0	0.33	0.19	
11	0.10		0.990		0.53	0.37	121	2.3	0.09	0.05	
12	0.30						135	2.3	0.04	0.03	
13	0.50						136	2.4	0.04	0.07	
14	0.70						121	2.3	0.03	0.10	
15	1.00						133	2.2	0.04	0.07	
16	1.50						122	2.2	0.02	0.06	
17	2.00						121	2.1	0.02	0.10	
18	3.00						104	2.4	0.00	0.09	
19	10.00						73	2.8	0.01	0.13	

FIG. 7

SPECI- MEN No.	ADDITIVE		MAIN COMPONENT $Pb_{\alpha}[(Mn_{1/3}Nb_{2/3})_xTi_yZr_z]O_3$ ($x+y+z=1$)				ELECTRIC PROPER- TIES Q_{max}	HEAT RESISTING PROPERTIES $ \Delta k_{15} $ (%)	TEMPERATURE CHARACTERISTICS	
	Al_2O_3 (wt%)	SiO_2 (wt%)	α (mol)	x (mol)	y (mol)	z (mol)			$ \Delta F_0(-40^\circ C) $	$ \Delta F_0(85^\circ C) $
20 *	0.5	0.02	0.990	0.02	0.56	0.42	29	1.1	0.24	0.14
21				0.04	0.58	0.38	81	0.9	0.11	0.14
22					0.56	0.40	85	1.0	0.25	0.02
23					0.55	0.41	117	1.4	0.29	0.09
24 *					0.54	0.42	108	1.4	0.54	0.19
25				0.06	0.56	0.38	95	1.1	0.09	0.04
26 *					0.52	0.42	177	1.5	1.10	0.77
27 *				0.08	0.59	0.33	98	1.5	0.28	0.41
28					0.54	0.38	112	1.7	0.11	0.02
29				0.09	0.55	0.36	114	1.8	0.03	0.19
30					0.54	0.37	119	1.8	0.05	0.11
31					0.53	0.38	124	1.5	0.13	0.03
32					0.52	0.39	154	1.8	0.24	0.07
33				0.10	0.58	0.32	81	1.7	0.23	0.30
34					0.54	0.36	147	2.1	0.02	0.14
35					0.53	0.37	146	1.8	0.05	0.06
36					0.52	0.38	158	1.7	0.14	0.02
37					0.51	0.39	183	1.6	0.25	0.13
38				0.11	0.53	0.36	135	2.7	0.00	0.09
39					0.52	0.37	127	1.9	0.07	0.00
40					0.51	0.38	163	2.0	0.16	0.10
41					0.50	0.39	170	2.0	0.27	0.22
42				0.12	0.58	0.30	80	2.2	0.29	0.40
43					0.56	0.32	98	2.3	0.20	0.28
44					0.50	0.38	177	2.6	0.13	0.15
45			0.995	0.09	0.55	0.36	128	1.3	0.00	0.17
46					0.54	0.37	131	1.6	0.08	0.08
47					0.53	0.38	129	1.2	0.14	0.02
48					0.52	0.39	154	0.8	0.26	0.10

FIG. 8

SPECI- MEN No.	ADDITIVE							MAIN COMPONENT $Pb_a[(Mn_{1/3}Nb_{2/3})_xTi_z]O_3$ ($x+y+z=1$)					ELECTRIC PROPER- TIES Q_{max}	HEAT RESISTING PROPERTIES $ \Delta k_{15} $ (%)	TEMPERATURE CHARACTERISTICS	
	Al_2O_3 (wt%)	Ga_2O_3 (wt%)	Ta_2O_5 (wt%)	Sc_2O_3 (wt%)	In_2O_3 (wt%)	SiO_2 (wt%)	α (mol)	x (mol)	y (mol)	z (mol)	$ \Delta F_0(-40^{\circ}C) $	$ \Delta F_0(85^{\circ}C) $				
	0.02															
49	-	0.02	-	-	-	-	1.000	0.10	0.51	0.39	141	2.2	0.40	0.25		
50	-	0.10	-	-	-	-	1.000	0.10	0.51	0.39	145	2.0	0.35	0.23		
51	-	-	0.50	-	-	-	1.000	0.10	0.51	0.39	166	2.7	0.12	0.07		
52	-	-	0.50	-	-	-	0.995	0.09	0.55	0.36	107	2.8	0.15	0.30		
53	-	-	0.50	-	-	-	0.995	0.09	0.53	0.38	119	1.9	0.03	0.17		
54	-	-	0.50	-	-	-	0.995	0.09	0.52	0.39	140	1.6	0.05	0.09		
55	-	-	-	0.02	-	-	0.990	0.10	0.51	0.39	147	2.9	0.25	0.12		
56	-	-	-	0.10	-	-	0.990	0.10	0.51	0.39	138	2.7	0.30	0.17		
57	0.45	-	-	-	0.02	-	0.990	0.10	0.51	0.39	131	2.2	0.25	0.15		
58*	-	-	-	-	-	0.20	1.000	0.10	0.51	0.39	81	4.5	0.15	0.13		
59*	-	-	-	-	-	0.30	1.000	0.10	0.51	0.39	129	4.7	0.09	0.04		
60*	-	-	-	-	-	0.50	1.000	0.10	0.51	0.39	120	4.2	0.16	0.13		